

## **Structure and Nonlinear Flow Behavior of Simple and of Complex Fluids (Invited)**

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The structure of a fluid as described by the pair-correlation function or by the static structure factor is modified by a viscous flow. This modification already exists in the linear flow regime (newtonian behavior) but it becomes more pronounced at higher shear rates where non-newtonian effects, such as a dependence of the viscosity on the shear rate and normal stress differences prevail. Examples are presented for fluids composed of spherical particles, in particular "simple fluids" and dense colloidal dispersions, and for "complex fluids" composed of nonspherical particles and polymeric chain molecules. Calculations based on kinetic equations for the pair-correlation function or for the orientational distribution function are compared with results obtained by non-equilibrium molecular dynamics (NEMD) computer simulations, as well as with rheological and neutron scattering experiments.